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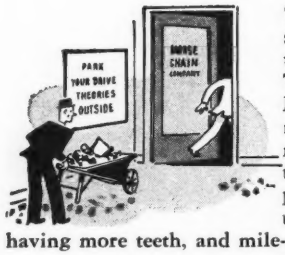

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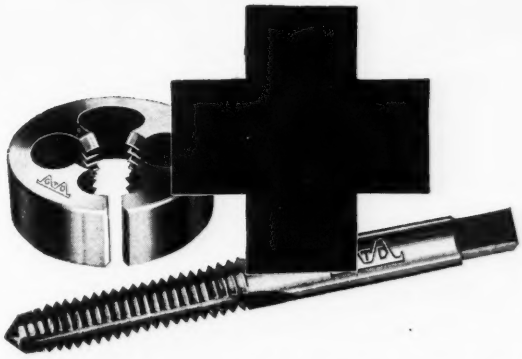

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THE SPORT SHOP

Editor's Column . . . . . R. C. Ross '41

The Seniors in the College of Engineering are the victims of a paradox. This year more companies interviewed the Seniors, came earlier, and offered higher wages than ever before; a good indication of the need for trained men in this national emergency. A large percentage of these Seniors and particularly those standing at the top of their classes, the most sought after by industry, are enrolled in the advanced R.O.T.C. courses. In February these men were notified that they would all be called for active duty upon graduation. Many other Seniors have been called by their draft boards and deferred until July. Now these very same Seniors who have been told all year long of the need for trained men in industry during the national emergency and to whom have been pointed out the mistakes made by such nations as France in taking trained men from industry for active army duty, find themselves denied the opportunity to serve in industry.

All of these men feel the obligation towards their country. A few of them welcome the opportunity for military service, some desiring permanent commissions in the army, and others even joining the Air Corps. The majority, however, feel that they can be of greater service to their country in industry, where their technical training may be used to best advantage and this is their golden opportunity to find the job they desire. The fact that this chance has been refused will in no way diminish the effort, interest, or zeal which these Senior Engineers will put forth in the Army.

With the April Issue of THE CORNELL ENGINEER, the class of 1942 will officially assume control of the magazine. The present Senior Board has had the pleasure of working with these men for the past three years and we feel that they are capable and will do a splendid job on the ENGINEER during the year to come. We take this opportunity in print to wish them the best of luck and to thank them for the part they have played in our success. The selection of the class of 1942 to fill the positions on the Senior Board will take place on March 11 at the annual meeting of the Board of Directors of the CORNELL ENGINEER, INC. and the change will be officially announced at the Annual Banquet of the CORNELL ENGINEER on March 14. Also at the banquet will be announced the election of several new Advisory Board members to fill vacancies created during the past year. The details of these changes will appear in the next issue. The personalities in the next issue will be those of the retiring Senior Boards. This will be the reader's chance to become acquainted with the men who have been running the magazine during the past year.

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Electric Arc Welding in the Freshman Engine Lab.

The Educational Policy of the College of Engineering

PROF. S. C. HOLLISTER

The Dean of the College of Engineering Outlines the Purpose and Policy of the College

THE primary function of the College of Engineering is to train men in the basic courses in engineering. All operations of the College revolve about this undergraduate training. Whatever the College undertakes must be judged by its effect upon this basic instruction. Instruction in engineering has been given at Cornell for more than seventy years. During that period, much of the modern development in engineering has taken place. The educational pattern has required continuous adjustment to keep pace with the changing requirements. Through this changing pattern there runs a continuous and sustained basic plan which serves as a skeleton for the educational structure of the College.

The College recognizes that an engineer's training must be adaptable to changing demands of the future. No one can foresee the nature of engineering applications twenty years hence, and yet it is precisely for such a period that the colleges train their students. It has been and continues to be the policy of the College to train men in fundamental subjects so that they are basically equipped adequately to meet changing conditions as they may develop, rather than to undertake to train men primarily in the light of present-day practice. Thus the College differentiates between training in fundamental principles and training in techniques.

It is the policy of the College to avoid any considerable degree of specialization in the undergraduate program. So much basic knowledge is demanded of engineers both now and in the future that specialization can not be accomplished without omitting fundamentals. Specialized training in the undergraduate years can, therefore, be accomplished only at the expense of broader and more fundamental instruction. The College has pursued and will continue to pursue the policy of providing for specialization only after the fundamental training has been given.

Dean Hollister began his education as an engineer in the State College of Washington and finished at the University of Wisconsin in 1916. Upon graduation he went to the University of Illinois to teach Mechanics for a year. From Illinois he moved to Buffalo and worked there for a year as a research engineer with the Corrugated Bar Company. Next came a two year period with the U. S. Shipping Board as chief engineer.

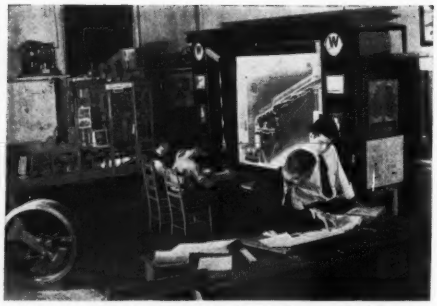
Following an additional ten years experience as a consulting engineer in Philadelphia, Dean Hollister returned to pedagogy. This time he went to Purdue University as professor of structural engineering and assistant director of the testing materials laboratory. He remained at Purdue for four years before coming to Cornell in 1934.

Dean Hollister began his career at Cornell as Director of the School of Civil Engineering and in three years moved to the position he now holds.

One of the difficulties of too narrow a training is the possible danger that the field of specialization may become obsolete and that the person trained in so narrow a field will not find it easy to adapt himself to a new field because of lack of fundamental training. The College is constantly called upon to advise young men as to the sound course along which to proceed, and it consistently recommends the basic training which may, at a later date, be supplemented by any desired amount of specialization.

The undergraduate courses of the College are four years in the case of Civil, Mechanical, and Electrical Engineering, and five years in the case of Chemical Engineering. Training for the latter field consists in a thorough grounding in chemistry in addition to a thorough grounding in engineering principles and applications. In order adequately to combine these two major factors in this training, a minimum of five years is required. Even with the additional year, the policy of the College to train in terms of fundamentals is strictly observed.

Conventionally the engineer is conceived to be a man who devotes his thought and energy to problems in materials, processes, and mechanized operations generally. In addition, however, he is usually concerned also with financial matters, labor relations, and economic aspects and consequences of industrial operations. The expanding technical background of engineering has put heavy demands upon the standard curriculum for increased content in technical training. There is similarly a demand for increasing the basic training in social and economic subjects. Many educators believe that all engineers should receive training in all of these fields.



Students at Work in the Heat-Power Laboratory

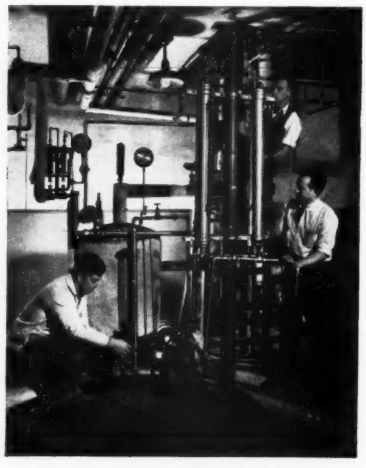
They recognize that such a program can not be carried out satisfactorily in four years, but will require a minimum of at least five years.

Although the College is constantly studying this situation and recognizes the increasing pressure and the tendency toward this general requirement in engineering education, its present policy is to permit a student to elect either the straight technical courses or the combination five- or six-year programs which permit a more extended study in the social and economic fields.

Enrollment in the College is limited to the number of undergraduate students that may be served by the staff and plant available for the purpose. In selecting those who may be admitted to the courses in the four Schools, the College undertakes to choose those who by qualifications and training would seem most likely to profit by the training which the College offers.

It is the policy of the College of Engineering to offer a full range of instruction in the four Schools of Engineering extending throughout the undergraduate years and through additional graduate study to the doctor's degree. Graduate instruction in engineering was instituted at Cornell soon after the University opened. Such a program of graduate instruction is necessary to maintain balance in the primary undergraduate courses. Without this graduate instruction the undergraduate courses would undoubtedly in time be distorted from a properly rounded fundamental program. Moreover, a staff competent to give graduate instruction can better devise and carry out a program of undergraduate instruction. It has been the consistent policy of the College that staff members giving graduate work would also give undergraduate instruction. Thus, leading members of the staff contribute their influence to the undergraduate students and curricula.

Since the founding of the College, one of its functions has been conceived to be the development of new knowledge in the engineering field. Over the years staff members and qualified students have contributed greatly to general professional knowledge. The presence of research activities has had a helpful influence upon a number of factors important in the functioning of the College.



Small-Scale Fractioning Equipment

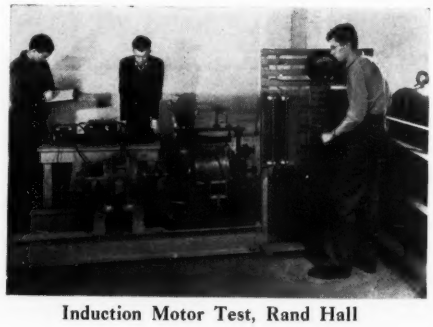
The College has encouraged and participated in research of basic character. In this way front-line problems of the profession are worked upon by the staff and serve a mutual advantage of bringing industries and the staff into closer relationship. Moreover, such research is a constant reminder of the fact that engineering is vitally alive and instruction in it can not become static.

Few industries can group together the number of scientific specialists that may be found in a great engineering school. Basic research may usually be accomplished in such an institution more effectively and at much less cost than in industry.

It is the policy of the College not to make major appointments to the staff for the sole purpose of accomplishing research. Junior members of the staff may be appointed for this specific purpose, but the direction and supervision of such research is done by men who are also engaged in the instructional program of the College. Sound and up-to-date teaching can be done only by those with a lively and inquiring interest in the subject. Men in important faculty positions insist upon the opportunity to pursue their studies in order to keep informed of advances in their field. Thus the teachers themselves recognize the sound policy of pursuing research in conjunction with their teaching operations.

An educational institution must constantly keep in mind that its primary function is to give instruction. The amount of research undertaken should be for the purpose of contributing to and not detracting from this major purpose. The beneficial effects upon the instructional program derived from research not only render such research desirable, but make it a necessary factor in the function of the College.

The educational policy of the College of Engineering thus embraces programs of undergraduate and graduate study and basic research, each of these in carefully adjusted proportions, in order that the primary purpose of basic instruction in engineering shall be enhanced.



Induction Motor Test, Rand Hall

The City That Grew from a Desert

PAUL W. LEIGHTON, C.E. '42

The Effect of Successful Reclamation Upon the Development of Twin Falls, Idaho

RECLAMATION means little to most people; however it is a vital factor in my life. In the south central part of Idaho on the banks of the Snake River is one of the largest irrigated sections in the world. The hub of this region is the city of Twin Falls in which I live.

This city of 12,000, with a farming population of 80,000 within a radius of 50 miles, developed from a valley of sagebrush ruled by jackrabbits, snakes, and coyotes into a place that many people think is practically heaven. Twin, as the natives call it, is a pleasant and progressive little city with wide paved streets shaded by big trees. The houses are kept brightly painted, and the lawns are green and neatly trimmed all through the summer.

A branch of the Oregon Short line goes through Twin and connects with the main line of the Union Pacific at Minadoka. There is a sugarbeet factory, which runs for four months out of the year, and there are a couple of banks and the usual department stores, grocery stores, service stations, drug stores, and saloons. We have three theaters, five dance halls, and the biggest broadcasting station in Idaho.

Altogether our town is an up-to-date and progressive city, a place that offers to everyone the opportunity to live a wholesome, normal, happy, and healthy life amid surroundings that tend to uplift and broaden the mind and spirit.

It is a young city; in fact it is only *thirty-seven years* old. The Twin Falls tract that my grandfather saw when he first gazed upon the Snake River Valley in 1902 was quite a different picture from that presented by the green trees, farms, good highways, and comfortable homes of today.

In 1887, I. B. Perrine crossed the sagebrush desert from Shoshone and settled in the Snake River canyon at the mouth of Blue Lakes, about two miles north of the present location of Twin Falls. The stage coach line ran five miles from the ranch, and the stations dotted the desert from Rock Creek west to Boise, 140 miles away, and 90 miles to the gold-booming towns of Ketchem and Hailey. However, his nearest true neighbors were the cattlemen, Stricker and Brose, 20 miles southeast at the edge of the Minadoka Hills on Rock Creek.

This article is part of an essay which in 1940 won the Guilford Essay Prize, one of the highest honors in English composition given by Cornell University. Few, if any, students from the College of Engineering had ever won the prize, and so far as the records show Paul Leighton was certainly the first sophomore engineer to receive it. He is a McMullen Regional Scholar from Twin Falls, Idaho, was president of the Sophomore Class in the School of Civil Engineering, is a member of the Board of Managers of Willard Straight Hall, and has won further recognition for his work in the Cornell Radio Guild and the Cornell Dramatic Club.

Perrine cleared the land along the bottom of the canyon; then, using the water from the lake for irrigation, he started farming. He was amazed at the tremendous crops that the land produced, and he wondered how the water of the Snake, the only available source, could be utilized to irrigate the vast acreage above the canyon; but the Snake entered a canyon thirty miles to the east, which ranged from 400 to 800 feet deep, and from 1,000 to 1,500 feet wide.

Since engineering had been Perrine's vocation before moving west, it wasn't long before he had completed a plan by which he could irrigate over five hundred thousand acres at a cost of about one million dollars.

After several trips to Boise he communicated with some financiers from Pittsburgh, who liked his plan and were willing to back him. They formed the Twin Falls Land and Water Company. Twelve years after Perrine had first proposed his plan, the necessary money had been raised, the water rights bought up, and the land opened for homesteading under the Carey Act.

In the spring of 1902 Milner Dam was started. It was no easy undertaking. All the supplies had to be freighted in by team from the railroad at Shoshone 50 miles away, and the machinery and equipment, in that section of the country for building an earth dam 120 feet high and 1,600 feet long across one of the wildest parts of the Snake River, was practically nil. The dam was constructed at the Star Rapids across the Antoine Clappine Islands, about 30 miles from Twin, the point where the Snake enters the canyon.

Two main canals, each over 100 miles long, were constructed on the south side of the river, the lowline and the highline. There were also many miles of branch coulees built. The water for the highline had to be pumped up about 100 feet before it entered the canal; the water for the lowline entered it at the dam level. In one place the lowline had to cross the Rock Creek Canyon; so they built a huge siphon down into the hundred-foot canyon and up the other side. By the fall of 1904 the job was complete. The intricate system of canals was finished, the reservoir behind the dam was filling, and water would soon be flowing through the canals.

Twin Falls in 1906 at the Site of the Present Business Section.

Jim Shield, my grandfather, packed up his family and started from Denver to Idaho in 1902. He headed for the Snake River Valley when he heard of the land boom that was sure to follow as soon as the dam was completed.

July, 1902 found this family of six winding their way up from Almo through the grotesque City of Rocks towards the ridge from where they would be able to see the valley which was to be their home. It was not a pretty sight that greeted their eyes as they paused on the ridge to let the horses rest. Sagebrush in every direction. As far as the eye could see toward the west the sage stretched into the sky. Towards the north the sagebrush stretched 100 miles into the jagged Sawtooth Mountains. The east was just a repetition of the west.

Somewhere out in that vast valley the Snake River flowed—the river that was to provide the means of living for thousands of people; and yet not a person was moving on the dusty trail that wound down the ridge through the Mormon village of Oakley, the only green spot on the land, and off around the edge of the hills towards the west.

A journey that would take us only an hour today took them two days. So it happened that at night they found themselves at the little stage-coach station of Rock Creek.

To the questions of my grandfather the barkeeper in the hotel replied:

"Nope, they ain't got the dam finished, but they're workin' on it. The land's open for homesteadin' and they expect to start sellin' water rights the last of August. Ifen you want to really get in on the town that's goin' to be a big city, you'd better buy some land from old man Stricker and settle down right here. The Strickers have been here since '80 and they got influence, so the railroad is sure to come through here. It's damn foolishness tryin' to start a town out in the middle of the desert. Did you ever hear of the stage coach station the Hotel De Starvation? It's only 75 miles out in the desert, and they used ter have a sign above the door that said—'Hotel De Starvation, 1,000 miles from grain, 75 miles from timber, 15 miles from water, and 12 inches from Hell!'

"This little creek out here goes into a canyon an' one of them irrigation canals has got to cross it and you know what? They're goin' to build a pipe down into it and up the other side and they think the water's goin' to run right through. By God, even they ain't good enough Mormons to make water run up that steep of hill and they say they ain't goin' to use a pump. My advice to you, mister, is you'd better park your shootin' irons right here."

However, I. B. Perrine had advertised his project well, and my grandfather pushed on the next day to Twin Falls. One look at the town and he was almost convinced that the fellow at Rock Creek had been right.

It did not amount to much, with only two shacks and a few tents scattered here and there. But having come this far, he hated to turn back. He looked over the survey lines, picked out a likely looking corner lot, and started clearing sagebrush in order to pitch a tent for the night.

The surveyors worked feverishly to get the townships surveyed so that the water rights could be sold. Many times have those surveyors been sworn at by others who have tried to go by their maps. However, if the engineers of today realized that the townships were surveyed by tying a rag to the wheel of a buggy, setting a line by compass, and taking off across country for some distant object on that line, and when the wheel had turned over a thousand times stopping the horses to get out and drive a section corner stake, realigning themselves and starting out again, they would never attempt to go by the old lines. It is strange that they should survey land that was to be worth so much by such inaccurate methods when better methods were known and were used on the canals. In this one phase of engineering they did a very poor job, and even today occasionally there is an argument which has its origin in the inaccuracy of counting the revolutions of the buggy wheels.

So it was that in the year 1904 the little town of Twin Falls, Idaho, came to life with the selling of the water rights. About 5,000 acres of land were sold the first week. Soon after the water rights went on sale, rough shacks began to dot the landscape, while huge piles of sagebrush grew as the land was cleared.

A 12′ by 16′ shack had to be built and five acres of each forty had to be cleared and cultivated the first year. The land was bought from the Government at 25 cents an acre, but the land was valueless without the water rights. At $25 a share or $2,000 an acre foot continuous flow, the Twin Falls Land and Water Co. was a financial success. It is a very good example of a reclamation project that was completed without Government aid.

Grandfather hung out his shingle, "J. Shields, Counsellor at Law"; the Eagle Rock Saloon got under way; and a general store with a freight line to the railroad at Minadoka was started. Day after day the stage would arrive full from the east and leave for the west empty.

Shortly after my grandfather and his family arrived in Twin, my father started keeping a diary. The following excerpts show the growth of the town and region.

"1905—Twin Falls is a going concern. News of the opportunity

here has evidently spread far and wide. Only 25,000 acres had been sold by the first of April, but as soon as the spring thaw set in and the Snowville Pass was open, enough immigrants came in so that 35,000 acres were sold in two days' time. There are about 1,000 people in town and about 6,000 on the farms around here.

"1906—The railroad's here and we are going to have a celebration next week that will probably scare all the coyotes out of the county. The Idaho Power Co. is going to put in a plant at Shoshone Falls. Lots of the people don't like it, because the falls are the biggest scenic attraction around here. Shoshone is 60 feet higher than Niagara, and you can see the mist from the falling water above the canyon wall, which is 800 feet deep at that place. The power plant will probably be built, though, since the Idaho Power has the water rights.

"1911—This town is growing fast. Before long it will have 5,000 people. There were 4,750 by the 1910 census. It has taken them quite a while to open up the north side. They have been working on the canals since 1906, and the tract is just opening up. Of course the canals had to go through some lava rock and the good farm land is not all together, as it is here on the south side. We are all glad to see it open up, as it means more people and will really make this section of Idaho worth something.

"1912—Another tract just north of here and above the highline canal will soon be opened, and of course Twin Falls will get all the trade from that area. The Salmon Falls Land and Water Co. built a dam 125′ high across the Salmon Falls Creek and they figure that they will be able to irrigate 150,000 acres.

"Land is selling pretty high around here right now. $600 an acre for land with peach trees on it, and $350 to $400 for just good farm land.

"Another grade school was just built and we have a nice high school. The town is growing every year. We have two banks now and there are a number of good stone buildings on Main Street.

"Dad is probate judge now, not bad for a correspondence school lawyer; so I guess it's a good thing he had faith in reclamation.

"1920—Everyone's back from the war that's coming back, and many people have moved in. The 1920 census shows 7,000 people in town. There's been a good deal of building the last few years and some fairly big ones like the Post Office, Court House, County Hospital, Elks Building, and a lot of other smaller buildings up and down Main Street.

"Most of the farms on this side of the river have electricity, and people aren't quite as much aroused against the Idaho Power as they used to be.

"Main Street has been paved for a number of years, and many of our other streets are being paved now. Also, with the state's help, the county will soon have all the roads graveled."

One of the first things I can remember was a trip in 1926 when my father, from whose diary the preceeding excerpts were taken, took me out to look over the site for the rim-to-rim bridge. The bridge is just east of the old Blue Lakes grade. It is a cantilever bridge, the highest one of its type in the world, 400 feet above the water and 1,400 feet long. Twin was happy about the bridge because it brought the people from the north side over to Twin to do their shopping, and that was what the Chamber of Commerce was trying to accomplish.

The summer of 1933 was the first year that I did any work on a farm. Because of the drought in the Midwest the previous year, hay brought a good price, and there were many acres of it on the Twin Falls Tract. I was surprised to find that out of the ten men on the hay crew I was the only one from Idaho. The rest were from the Midwest. Most of them were new arrivals in Idaho. The drought the previous year had licked them, and so they headed for an irrigated region. According to them, the amount of hay that was being shipped from around there would not be a drop in the bucket compared to what was needed. Also, they said that if the drought did not let up that year, about half the farmers would leave the Midwest and head for the irrigated land west of the Rockies.

It happened. When the drought accompanied by the dust storms really hit the Midwest from 1933 to 1936, the people came by the hundreds. From every state in the Midwest, Nebraska, Missouri, Kansas, and the Dakotas, they came, to a place that was green all summer, where there was no danger of losing the crops from lack of water or through wind storms.

The town was flooded with destitute families. The relief rolls jumped. The greater percentage of them holed up in Rock Creek Canyon at the edge of town. Cardboard and tin shacks sprang up throughout the length of the canyon.

Since many of them had little or no education, and they would work for lower wages than the Idaho people, it became a common saying that there were only 47 states in the Union now: Missouri moved to Idaho and Idaho went to Hell.

Many of them thought that the land was probably the same price as in the Midwest and that you could start farming with a little capital, and were disappointed when they found that the $500 to $1,000 they had would not even buy the equip-

(*Continued on page* 26)

Shoshone Street and Main Street, the Heart of Twin Falls. Twenty-Four Years Later.

Engineering

Professor J. O. Jeffrey

To the stream of troubled junior M.E.'s who find their way into Professor Jeffrey's office in East Mech Lab, he is always a cheerful and helpful adviser. A junior who was giving his last regards to "Joe" instead of "Davey", dropped in to say good-bye. Prof. Jeffrey shook him by the hand like a real pal.

"Good-bye, Jones, and good luck to you. Let me know if I can ever help you."

These were not routine words. They were sincere, and Prof. Jeffrey proceeded to investigate employment opportunities for this man now, when he needed it.

"Joe" Jeffrey

The general enthusiasm and spirit which are characteristic of Prof. Jeffrey originated when he was a boy playing baseball on the sandlots of New York City. It was there that he first learned fair play and developed the genuine love for sports which he has today. Every Saturday that Columbia had a home football game, Joe would find a hole in the fence and be in there singing the Columbia Alma Mater and shouting the Columbia cheers. He was a Yankee fan too. When he went to watch them play, people in his section knew Joe was there; he wasn't the kind who sat silently when he thought the pitcher should be sent to the showers.

Being the son of a Cornellian, Joe left the big city to become an engineer at Cornell. He wasn't exactly the hermit type, but nevertheless he was an originator of the "Hermit Club" in the dorms. The bull sessions, bridge games, intramural sports, and Spring Day activities of this group, as well as tutoring mechanics on the side, kept the young engineer busy.

He graduated from the Sibley School of Mechanical Engineering in 1925, having spent his previous two summers working first in the shop of International Motors, and then in the drafting room of the Curtiss-Wright Aircraft Co. During his senior year, he was elected to membership in Phi Kappa Phi, national scholastic fraternity.

It wasn't long after graduation that two offers to teach, one from Cornell, the other from Lafayette, drew him away from his job with the Curtiss Co. We all know which one he accepted, and now we ought to know why. The new mech lab instructor was soon given the opportunity to give lectures in materials of engineering to assist Professor Diederichs, who was then both head of the mechanical laboratories and sole lecturer in materials. Prof. Diederichs still gave the 9 o'clock lectures and there in the back of the room was Mr. Jeffrey cramming for his 12 o'clock. When Diederichs was made Dean of the College of Engineering, Professor Jeffrey began giving both lectures. From that beginning he has become, by informal study of books and periodicals, the metallurgical expert that he is.

Professor Jeffrey has kept in practical touch with his field by working in the G.E. research laboratories several summers ago, and by carrying on his own experimentation. He was elected to Sigma Xi, honorary scientific society, for the latter type of work in connection with heat transfer through the walls of condenser tubes. Under preparation is a paper on column testing. Jeffrey is a true experimenter, for he hates to have to apologize for experimental data which doesn't approach the theoretically supposed values, and is

(*Continued on page* 26)

Robert E. Ohaus, ME

One day during the summer preceding his freshman year, a friend of Bob's called his attention to a small item in a Newark newspaper which told of the John McMullen Regional Scholarships. Interested in Cornell and, at the same time, in the possibilities of receiving a scholarship, Bob wrote to the University; after preliminary questionnaires and an interview he was chosen by the board and awarded the scholarship—which he has retained throughout his four years.

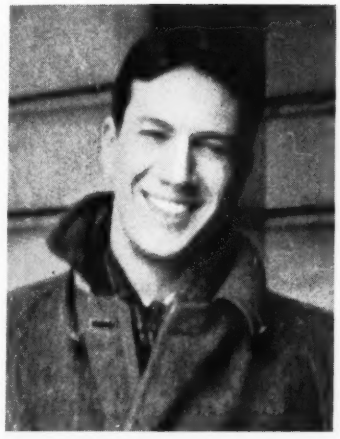
During the past three summers Bob has been employed by the Newark Scale Works. Following his freshman year he served during the summer as a general handy boy and assistant; during the summers following his sophomore and junior years he worked as a machinist and received much practical experience in the shop. Two years ago he and a friend took a sightseeing trip through eastern Canada before returning to school.

Bob has a very imposing list of honors and activities. It includes treasurer of Tau Beta Pi, vice-president of Atmos, manager of freshman soccer, secretary-treasurer of the ASME, editor-in-chief of the Freshman Desk Book, and compet manager of the Cornell Forum series. Bob prescribes editing the

(*Continued on page* 28)

"Big Ed" Ohaus

Personalities



Lone Star Stater

Porter W. Gifford, AE

Lanky Pete Gifford is a real product of his environment. Endowed with the long frame and lean face traditionally typical of the colorful West, this son of Texas fits the bill so perfectly that one could easily imagine him racing through the reels of a western thriller.

Pete, who hails from Dallas and whose family roots are solidly western, came to Cornell for the business training based on engineering principles that his observations and experiences in his father's business had shown him to be so valuable. After four years of high school in Dallas and a year at New Mexico Military Academy, Pete entered the Administrative Engineering course with advance credits which have enabled him to take many desired elective courses and also to earn his Second Lieutenant's commission in the ROTC after his junior year.

But he also packed along a tremendous supply of energy whose effect is very apparent in an imposing list of honors and activities. Plunging right into the welter that is Cornell, he emerged successively as a member of Delta Kappa Epsilon, the Freshman Advisory Committee, and Kappa Tau Chi. Last year he was a member of the Junior Week Ice Carnival Committee which staged the glittering "Satan's Holiday". Fresh from this triumph he went on to guide the work of the Navy Day Ball Committee. Recognition for his efforts soon came in election to Sphinx Head, Scabbard and Blade, secretaryship of the Freshman Advisory Committee, and vice-presidency of his fraternity.

Home not being just around the corner, vacation means a lot to Pete. Consequently he has made full use of such time. Two summers were spent very profitably in the machine shops of his father's gravel and concrete business, where he picked up much of the shop experience so necessary to the engineer or executive. Other summers found him as time keeper on various construction projects. But last summer a large construction job at Texarkana really rang the bell in his estimation. Rooming with two husky football men from Southern Methodist and Texas A. and M., Pete was hard put to maintain his prestige. The short period of six weeks work after ROTC camp was not quite sufficient time in which to settle all controversies on such matters as influence with the local belles and football superiority. Consequently Pete would like very much to repeat the experience.

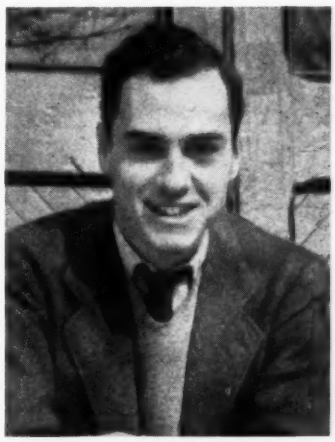
As to the future, he is quite indefinite. A call from Uncle Sam for his Reserve Officer's duty is imminent, but if that doesn't materialize, he expects to take up graduate work.

In contrast to most Cornell engineers, Pete has been able to indulge in a few music courses due to the free time resulting from his advanced standing on entering. With the most arduous part of his studies behind him, he is now able to relax in contemplation of a bright future with none but pleasant memories of a replete college career.

Edmund Friedrich, EE

Swooping down the snow-covered slopes of the Vermont mountains of his native Holyoke hills is Ed Friedrich's idea of heaven. But he has found that heaven and college can go together at Cornell, where his inveterate love for skiing is not hard to satisfy. And in doing so, he has done an admirable job of mixing business and pleasure. A master technician at getting the most out of college, "E²" has piled up an enviable record which surely reflects the incessant activity he has kept up.

Fascinated by glimpses of huge masses of whirring electrical machinery and switchboards with their tantalizing apparatus, he decided on a career in electrical engineering. Coming to Cornell after three years at Loomis, Ed immediately demonstrated his energy by winning his numerals in soccer, playing on the freshman baseball team, and playing in the University orchestra for three successive years.



Scholar on Skis

Things slowed down a bit in his sophomore year with only the orchestra, his skiing and winning his letter on the 150 pound crew to keep him partially busy. We say, "partially busy," because the all-important studies were not to be forgotten, and when only a junior he was doubly honored by election to Eta Kappa Nu and Tau Beta Pi. The singular distinction of membership in Phi Kappa Phi is further proof of his scholastic prowess.

(*Continued on page 26*)

Yellow River Regulation*

Translated from the Chinese by

CHEN-HSU T'ANG, Ph.D.

IN THREE PARTS

PART I—The Necessity for and Extent of Regulation

Illustrations Courtesy of American Society of Civil Engineers

WITH regard to river regulation we must first decide upon the purpose; then we can direct all our efforts toward fulfilling it. Consequently, we ask the question: "What is our purpose in regulating the Yellow River?" The purpose of regulation up to the present time has been only flood protection. Henceforth, flood control should be considered of primary importance and regulation of the river for navigation of secondary importance. Such miscellaneous uses as hydroelectric developments and irrigation are to be considered as by-products to be adapated in case circumstances are favorable. If flood protection were our only purpose, present methods of river regulation would be satisfactory; then we could continue with our present methods and it would not be necessary to look for new ideas. However, the present status of flood protection is really not satisfactory. The facts are as follows:

1. The yearly expenditures for flood protection in the three provinces of Honan, Hopei, and Shantung are almost one million dollars. Is there any better method that may be used to decrease this amount of wasted money?

2. Although flood protection requires such an amount of money, it is still impossible to prevent flood disaster from occurring every few years. Damages to property amount to several million dollars.

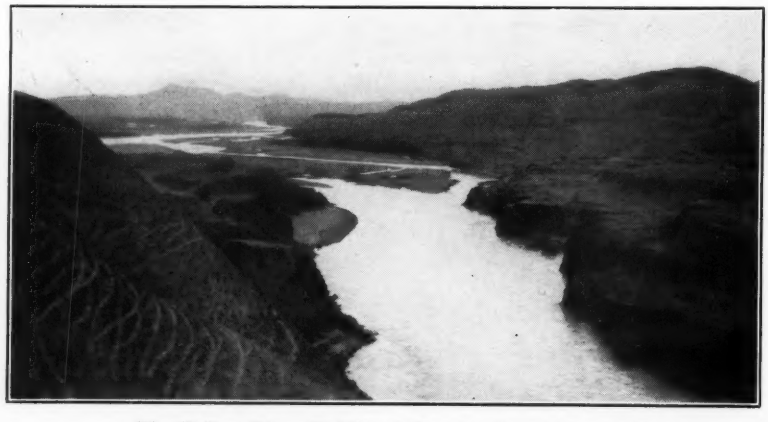
3. Each year the elevation of the river bed is raised and there is the possibility that the course may change at any time. If the river were to change its course the damage would be inestimable.

4. In flood protection we usually pay special attention to the lower reach of the river; there is also the possibility that disasters may occur in the middle and upper reaches of the river. (Suiyuan, Shensi, and Shansi Provinces).

From the above facts, even with regard to flood protection, it is necessary to consider new methods of approach.

Let us next consider the subject of river navigation. At the present time the river is navigable only for a few types of boats such as light-draft junks. From the modern point of view this type of navigation is considered no navigation at all. We understand the modern concept of the word navigation as implying the ability to accommodate modern steamers and heavy commercial traffic. The questions in point are—"Is it necessary to regulate the river from the standpoint of the demands of navigation?" and, if so, "To what extent?" It is quite worthwhile to investigate these questions.

Dr. T'ang was graduated from the Tangshan Engineering College, Chiao-Tung University, in June, 1935 with a B.S. in C.E. degree. After one year as an engineer with the Yellow River Commission and Shensi Irrigation Projects in China, he came to U. S. to take graduate work at M.I.T. and Cornell in Experimental Hydraulics and Hydraulic Engineering. He received his M.C.E. and Ph.D. degrees from Cornell University. During the summers, he studied at the U. S. Waterways Experiment Station, T.V.A. projects, Mississippi River Flood Control Works, and a dozen government and university hydraulic laboratories in this country.



The Yellow River 20 Miles below Lanchow, Kansu, 1931

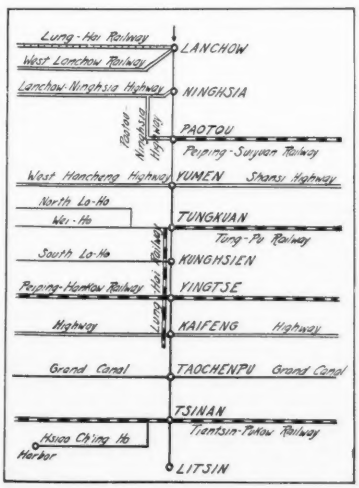
Regulation A Necessity

The Yellow River proper involves a drainage area of 756,000 sq. km., is over 4,000 km. long, travels through 9 provinces, and serves 140,000,000 people. Because it affects so many people and such a

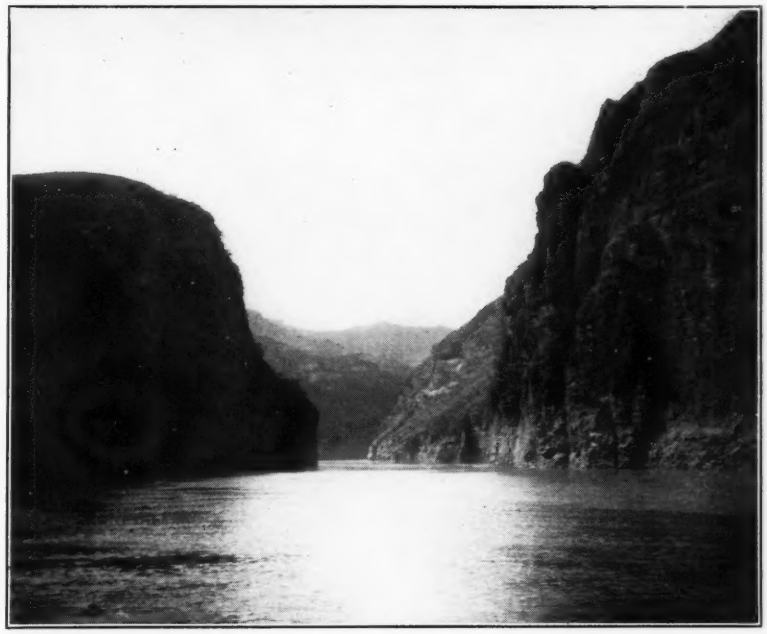
**Chapter 4 of Huang Ho Kai Kuang Chi Chih Pen T'an T'ao (The Yellow River—Its Present Status and a Study of its Regulation) by the Yellow River Commission, Kaifeng, Honan, China.*

large area, it would be regrettable if we did not use it for navigation and transportation. In the remote northwest part of China the Chinese government has just begun to devote its full efforts toward the development of these districts, which includes the stimulation of agriculture, opening of mines, and utilization of local raw materials for manufacturing purposes. This development of agriculture, mining, and industrial enterprises without transportation facilities is futile. The Yellow River passes through Ninghsia and Suiyuan provinces, which contain much stored corn and other grains. Even though the provinces are served by the Peiping-Suiyuan Railway, transportation facilities are not fully adequate. Shensi and Kansu Provinces furnish large supplies of drugs, hides, bristles, and bones. Supplies of salt, oil, and coal are also very abundant along the Yellow River. The mountain sides along the Yellow River could be planted with trees which could easily be cut and floated down the river. It is not possible to build a railroad through the afore-mentioned region at the present time, but it is possible to utilize the river. If we wish to develop the northwest section, it is absolutely necessary to improve the Yellow River, by which the transportation of the above-mentioned articles to the coast would eliminate the necessity for many foreign imports.

Downstream from Tungkuan the Lunghai Railway runs parallel to the river as far as Lanfeng, but from this point to the east the railway has lost its usefulness so far as its connection with the river is concerned. Above Tungkuan the river connects with the Wei Ho; and many heavy goods such as cotton, leather, bone, and the like are still transported on the river down to the railway station at Chengchow. Below this point millet and peanuts are produced along the river. Kung-hsien stone is also transported on the Yellow River, although transportation is very difficult at present. If we improve the river mouth of the Hsiao-Ch'ing Ho and its harbor facilities, make connections with the Yellow River, and improve the entire Grand Canal and Wei Ho (Ed. note: not the same river previously mentioned) from the standpoint of navigation, then traffic on the lower reaches of the Yellow River is sure to become very active. From the economic viewpoint of the whole nation it is necessary to improve the Yellow River.



Schematic Diagram showing connections between Yellow River and other communication systems.



The Yellow River Three Miles above Lanchow, Kansu, 1931

Extent of Regulation

To what extent is it necessary to improve the river? After careful consideration by the Yellow River Commission on the subject of navigation, the following general plan was outlined:

1. Do not put a harbor or port at the mouth of the Yellow River.
2. Use the Yang-Chueh-Kou of the Hsiao-Ch'ing Ho as the commercial harbor; make the connection between the Yellow River and the Hsiao-Ch'ing Ho in the vicinity of Tsinan. It is better to erect a freight wharf instead of using locks.
3. Do not allow ocean liners to travel above the freight wharf or above the Huang-T'ai Bridge.
4. Allow only tug boats between Litsin and the Yellow River Bridge at Chengchow. Erect a reloading station (from train to boat) near the bridge.
5. Regulate the river channel to accommodate junks from the Chengchow steel bridge up to Tungkuan. Steamers are not to be used, to avoid competition with the Lunghai Railway.
6. From Tungkuan up to Yumen, coal, salt, and iron may be transported by barge trains pulled by small steamers.
7. From Yumen to Paotou the river channel is to be regulated to such an extent that junks and rafts can navigate without difficulty.
8. From Paotou to Lanchow the river will be regulated to accommodate tug boats.

The plan has five main provisions:

1. The entire navigation system emphasizes the facilities of down-

A Village in South Hopei, Buried in Silt by a Yellow River Dike Break, March 1, 1935

stream traffic. It does not seem advisable to attempt to improve upstream traffic, as this would only encourage foreign encroachments.

2. At all points where there are connections with railways or other rivers, it is necessary to provide for tug-boat facilities to take care of distribution of home products.

3. For downstream traffic it is necessary to remove all such obstacles as shoals, rocks, steep slopes, exorbitant taxes, and pirates.

4. Boats traveling downstream may be sold upon their arrival at their destination along with the goods transported, and the men may return by train or highway.

5. Reforestation is to be carried on along the river, and the river is to be made the main outlet for the lumber produced in the Northwest Territory.

All the connections between the Yellow River and other navigation systems or railroads may be seen in the schematic diagram on the preceding page.

The Yellow River will have three sections for tug-steamer transportation. The length of the Lanchow-Paotou section is 990 km.; the length of the Yumen-Tungkuan section is 130 km.; the length of the Yingtse-Litsin section is 630 km. For the junks, the Paotou-Yumen section is 700 km.; the Tungkuan-Yingtse section is 335 km.

With such regulation we obtain a system of transportation that agrees with our purposes; moreover, the regulating expenses are not very high.

Flood Protection vs. River Navigation

Flood protection and navigation are two different items. All sections of the river except the upper reaches may be considered as navigation sections. The flood-protection sections are limited to the lower reaches, from Mengtsin to Litsin, a length of 800 km. Above this lower reach, from Tungkuan to Hotsin, flood disasters frequently occur, but so far river-protection works have not been used. In the Ho-Tao region of Suiyuan province the river channel changes frequently, but because the region is not heavily populated and because the land is not very well developed, no regulatory measures have been taken.

The next thing we wish to investigate is the possibility of handling flood-protection works and river-navigation works simultaneously. Let us compare the requirements of each.

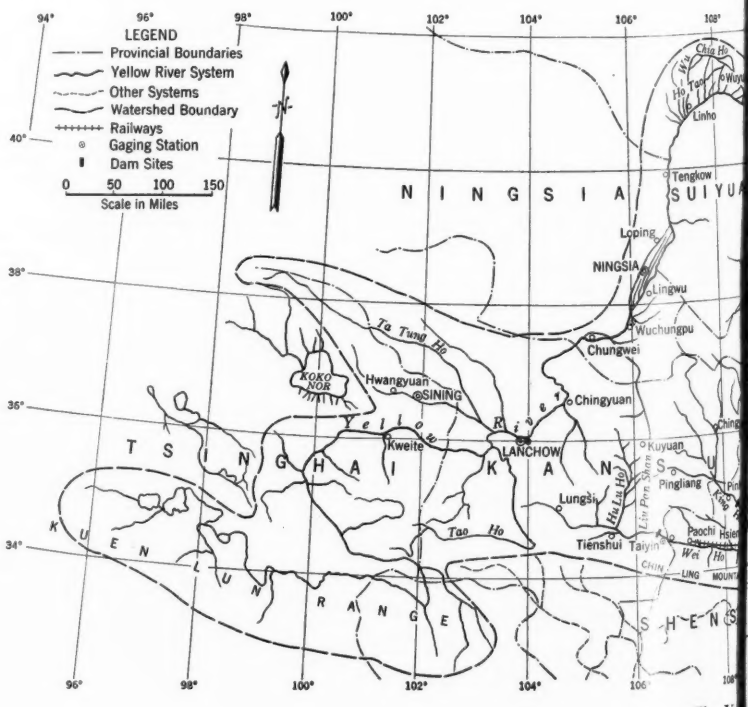
Table I

Requirements for Flood Protection Works

1. A stable river channel.
2. Deeper channel by scouring.
3. Regulation of maximum flood discharge.
4. Prevention of flooding, spreading, and branching of channel.
5. Regulated slope for river bed.
6. Sufficiently strong current.
7. Speedy removal of ice jams.
8. Reduction of silt.

Requirements for Navigation Works

1. A stable river channel.
2. Adequate depth for navigation.
3. Regulation of maximum flood discharge.
4. Single river channel.
5. Adequate water-surface slope.
6. Adequate depths.
7. Shortening of ice period.
8. Reduction of silt.



The Yellow River System

From Table I it may be seen that although flood protection and navigation are two different things, their requirements are entirely the same; there is no contradiction. The flood protection works and navigation works of the Mengtsin-Litsin and Yumen-Tungkuan sections may therefore be carried out simultaneously. Conditions in the Ho-Tao region are somewhat different; we will discuss them elsewhere.

The Yellow River may be divided into the following sections according to its topography:

1. From Lanchow to Chingtunghsia is a contracted reach.
2. From Chingtunghsia to Shihtsuitzu is a widened reach.
3. From Shihtsuitzu to Tengkow is a contracted reach.
4. From Tengkow to Hochu is a widened reach.
5. From Hochu to Lungmen is a contracted reach.
6. From Lungmen to Tungkuan is a widened reach.
7. From Tungkuan to Mengtsin is a contracted reach.
8. From Mengtsin to Litsin is a diked reach.

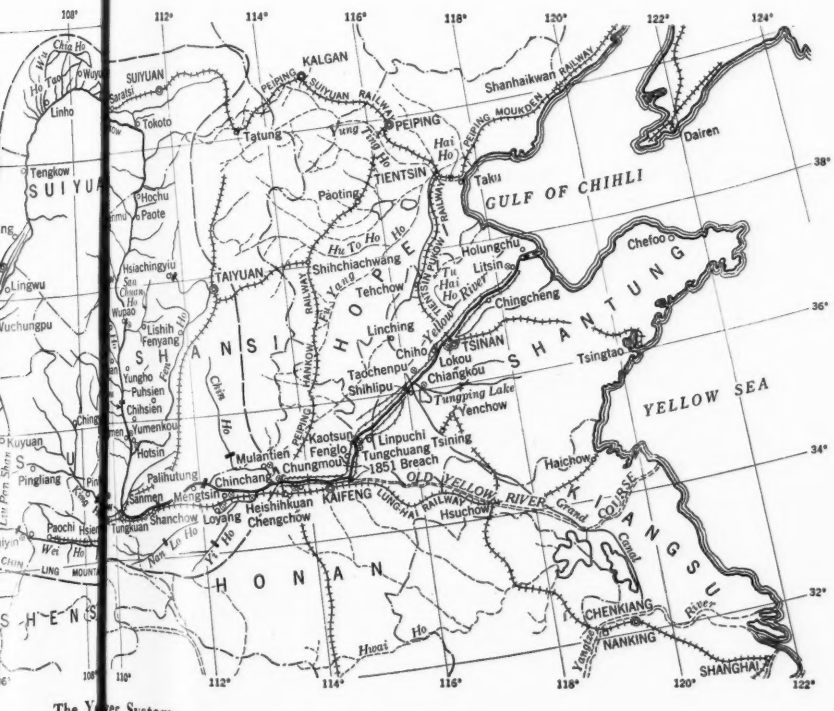
The contracted reach causes too many shoals. The current is too swift and in places there are waterfalls. In the widened reaches the river has too many small branches and creeks, the depths are too shallow, there is too much silt, and the river is constantly meandering. The contracted reach hinders only navigation; the widened reach not only makes navigation difficult but may also endanger the lives and property of the people. Although the diked reach has the dike for protection, there is still danger of dike failure with horrible consequences. The amount of money spent every year for repair and maintenance is considerable. Because the three reaches are different in character the methods of regulation are not the same. The nature and importance of regulation of different reaches of the river is shown in the diagram on the following page.

Ice Jam in Yellow River just above Litsin, Shantung, February, 1928

We will describe the necessary regulatory works, starting at the mouth and considering each reach in upstream sequence.

River-Mouth Reach

Up to the present, hydraulicians discussing Yellow River regulation have concentrated on the river-mouth problem, because they believe that if the river-mouth reach is not in good condition the whole river will be affected. But according to the reports on the inspection of the river mouth as submitted by the Commission Engineer in the year 1934, the discharge capacity of the river from Litsin to the sea is comparatively adequate. The slope of the river bed is steep. At the mouth, silt deposition is similar to that at the mouth of other rivers such as the Hai Ho, Kuan Ho, and Lin Hung Ho. Naturally, this type of silt in the mouth is an obstruction to navigation. Incoming and outgoing boats must wait for the tide in order to clear the bar. But does this obstruction decrease the flood discharge capacity of the river? It is a moot question. Some do not believe that river mouth works bear much relationship to the river regulation as a whole. It is believed that if the water reaches the river mouth, it cannot help emptying into the sea in one way or another; consequently, the discharge capacity will not be affected. If we use the



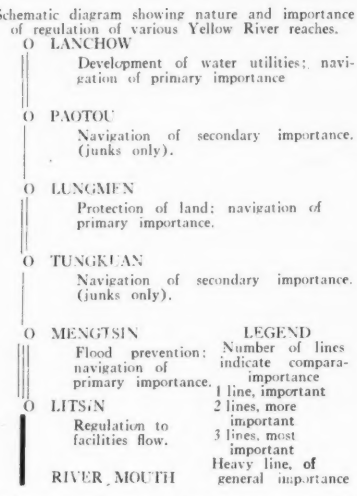
The Yellow River System

Hsiao-Ch'ing Ho as a harbor then we can abandon plans to develop the mouth of the Yellow River. The former breaks in the dike at Hsiao-p'ang - Chuang and Shih - T'ou-Chuang cannot be blamed on conditions at the mouth of the river, since at the time the breaks occurred the front of the flood wave was still above Tsinan, far away above the mouth of the river.

Conditions at the mouth of the river sometimes affect ebb and flood flows; flow conditions in the tidal reach may influence conditions of flow above it. If the velocity of ebb and flood flows is high as a result of river-mouth improvement there will be a greater transporting and scouring effect noted in the silt brought down by the river. It is still necessary, therefore, for us to investigate the river-mouth problem. What method should be used to increase the velocity of the tidal current so as to produce an adequate scouring effect on arriving silt? At present the depth of water on the bar is only 1 m. and the tidal range is a little over 1 m.; the flood tide is somewhat impeded and extends upstream only about 20 km. The tidal range and extent are less than those of the Hsiao-Ch'ing Ho and the Hai Ho, a phenomenon the reason for which we have not been able to discover.

The people of Shantung have contemplated extending the present dikes from Litsin down to the maximum point reached by the tidal waves in order to protect the land for agricultural purposes. The capacity of the new dikes will accommodate only the maximum flood discharge of the reaches above. If the dikes are extended into tidal territory, the distance between dikes and shape of dike cross section must be very carefully investigated. The Commission believes it is better not to build dikes below Litsin,—that it will be adequate to plant willows along the banks. The banks will be built up naturally by silting, and will be much stronger than dikes. The problems of building dikes near the sea, jetties, and related subjects need further study.

Using Tree Retards during the 1925 Flood in Western Shantung to Save Eroding Banks and Dikes along the Yellow River


Schematic diagram showing nature and importance of regulation of various Yellow River reaches.
LANCHOW
Development of water utilities; navigation of primary importance
PAOTOU
Navigation of secondary importance. (junks only).
LUNGMEN
Protection of land: navigation of primary importance.
TUNGKUAN
Navigation of secondary importance. (junks only).
MENGTSIN
Flood prevention; navigation of primary importance.
LITSIN
Regulation to facilities flow.
RIVER MOUTH
LEGEND
Number of lines indicate comparative importance
1 line, important
2 lines, more important
3 lines, most important
Heavy line, of general importance

Schematic diagram showing nature and importance of regulation of various Yellow River reaches.

Tying up Willow-Cased Stone "Sausage" to Roll into Last Gap in Closure Dike at Tungchuang Breach, March, 1936

Flood-Protection Reach

This reach is the 700-km. reach from Mengtsin down to Litsin. Dikes are built along the northern and southern banks of this reach. From the Chin Ho to the sea there is only one tributary entering the river—the Wen Ho—from the south bank. Because the stage of the Yellow River is comparatively high at the mouth of the Wen Ho, there is considerable backwater up this river to the Tung Ping region.

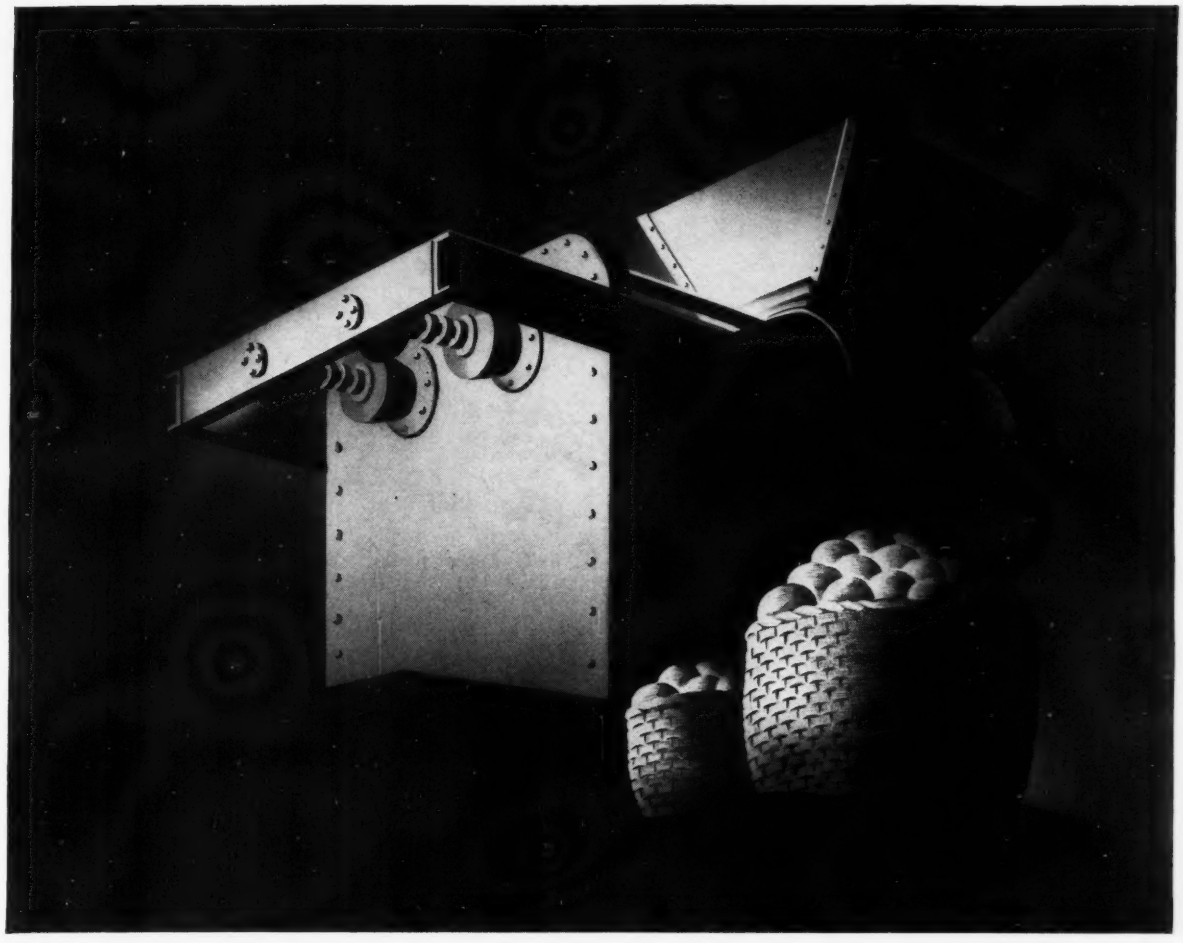
The land protected by the Yellow River main dikes can be divided into the following sections:

North bank

Wenmeng section—area north of dike, from Menghsien to the mouth of the Chin Ho.

Yuanfeng section — area from mouth of Chin Ho to Tachuchi.

(*Continued on page* 18)



MEETING A THREE-WAY DEMAND

A large fruit juice extractor looks so simple that there would not appear to be any special problems in the selection of materials for its parts. Yet, the screw must stand high pressures, and tramp iron can cause serious trouble. Ripe fruit won't wait for machine repairs.

Because it meets all three demands of the service so well one manufacturer of extractors now uses nothing but cast Carbon-Molybdenum steel for the screws. The steel (1) develops the requisite strength and toughness when normalized; (2) is comparatively inexpensive and (3) permits easy reconditioning when it is finally required — the worn spots being built up by welding and re-machined to original dimensions.

Here, then, is another case where the use of modern materials has economically achieved a distinct product benefit. Our book, "Molybdenum in Steel", is sent free on request to technical students and all others interested in modern materials for modern needs.

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Climax Mo-lyb-den-um Company
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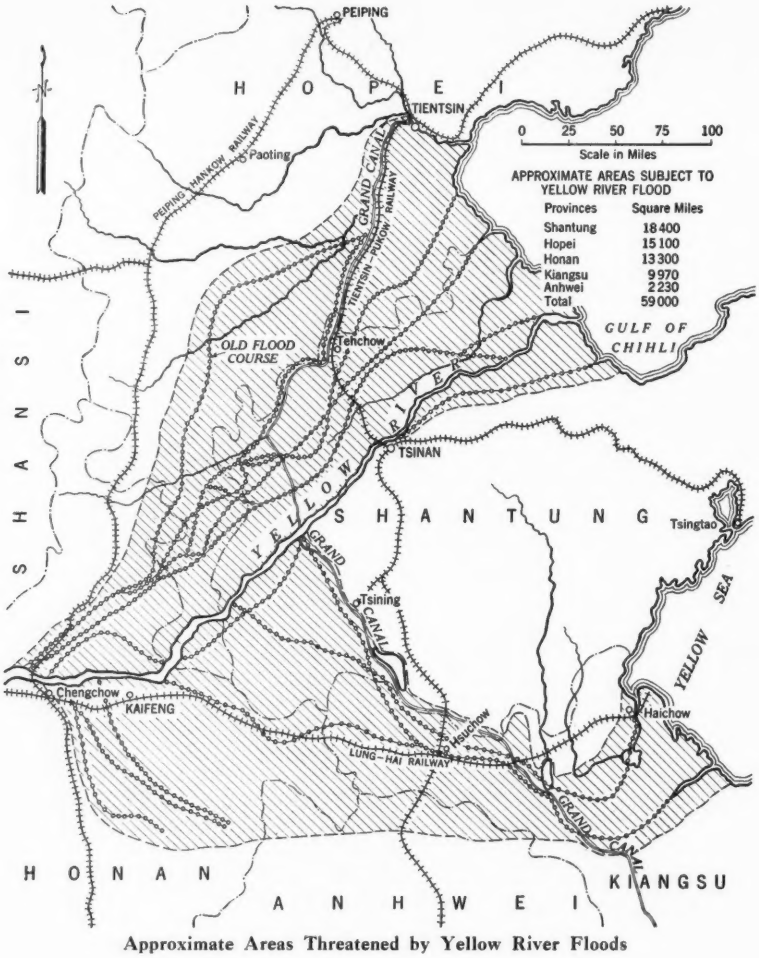
MOLY



Approximate Areas Threatened by Yellow River Floods

(*Continued from page* 16)

Changfan section — area from Changyuan to Fanhsien.

Poli section—area from Poping to Litsin.

South bank

Chengkai section — area from Yingtse (west of right dike of old Yellow River course) to Lanfeng. The section is bounded on the south by the Huai Ho and on the north by the right bank of the Yellow River.

Chüyeh section — area from K'aocheng to Shihlipu. The section is bounded on the north by the right bank of the Yellow River; on the south by Weishan Lake; on the west by the left dike of the Old Yellow River course; and on the east by the Grand Canal.

Tsinan section—a small area in the vicinity of Tsinan.

Ch'ing-cheng section and extending as far as the dike reach above the river mouth.

The area between the Golden Dike (Chin-Ti) and the dike from Kengmicheng to Taochenpu, built by the Shantung people, may also be classified as one section—the Chin-Ti section.

It is very hard to compute the area of each section, because after a dike failure the water occasionally extends beyond the limits of the section. For example, Weishan Lake is the southern boundary of the Chüyeh section. When the dike breaks in this section, the water floods into Weishan Lake, from there into the Grand Canal, and if the canal dikes fail the water floods into the Liu T'ang Ho. From here the flood may extend to the Yellow Sea. According to history, the Yellow River has changed its course several times and the area flooded is about 300,000 sq. km. The number of people to be protected is about 80,000,000.

Because of the influence and importance of the river dikes we are not able at the present time to neglect bank-protective works in planning other measures for river regulation. Our only alternative at present is to maintain the bank-protective works while we are carrying out regulatory measures.

The second part of "Yellow River Regulation", entitled, "River Channel stability", will appear in the April issue of THE CORNELL ENGINEER.

Placing Last Stone "Sausages" to Close Breach of 1935, at Tungchuang, Shantung, Along South Bank of Yellow River

2 *Damage to telephone lines* by storm and fire. Then an urgent call to Western Electric for supplies. And a quick answer—deliveries by truck, train and plane.

3 *On the weather front,* repair crews find everything they need at an emergency supply depot and go into action fully equipped. Geared to render such supply service to Bell System companies, Western Electric aids these telephone men to restore service quickly . . .

4 . . . so that the telephone subscriber can say:

"YES, THANKS, MY TELEPHONE'S WORKING AGAIN."

Western Electric

. . . is back of your Bell Telephone service

News of the Engineering College

Cover

The picture on the cover shows the beginning of excavation for Olin Hall of Chemical Engineering on the campus of Cornell University on February 17. University officials and the local representative of the general contractor are pictured inspecting the site just before the work was started. Left to right are Dr. F. H. Rhodes, Director of the School of Chemical Engineering; Dean S. C. Hollister of the College of Engineering; Dr. Edmund E. Day, President of the University; Hugh E. Weatherlow, Superintendent of Buildings and Grounds; and Grove A. Stanton, C.E. '07, representing John Lowry, Inc., who is actively superintending the job.

The $700,000 building, first of five in a program to give the College of Engineering an entirely new physical plant, is scheduled for completion in October of this year.

C. P. T.

The Civilian Pilot Training Program, sponsored by Cornell University with the cooperation of the Ithaca Flying Service, is under way. The course, given under the authority of the Civil Aeronautics Administration, is designed to train a selected group of men who may continue flying as private pilots and eventually enter military service.

The training is confined to 40 students of the highest type, whose activities, scholastic and otherwise, afford time for completing the training before June 1. This very intensive course requires about 10 hours a week. It prepares the student for a Private Pilot Certificate. It includes 72 hours of ground instruction at the University, and 35 to 50 hours of flight training and 18 hours of ground instruction at the flying field.

The ground instruction is given in West Sibley Hall from 4:15 to 5:45 p. m. on five days each working week throughout the term. About three hours a week is devoted to training at the flying field. At first the flight periods are of one-half hour duration, later one hour, with not more than two periods a day and at least two hours between periods.

Director W. N. Barnard is the Coordinator of the Cornell C.P.T. Program. Professor W. C. Andrae gives most of the ground instruction, and Mr. H. M. Peters directs the flight training.

Kimball "Drafted"

Joining the ranks of the constantly growing list of Cornell alumni and faculty members directly engaged in national defense work, Dexter S. Kimball, Dean Emeritus of the College, was recently appointed as tools and equipment priorities executive of the Division of Priorities of the Office of Production Management.

Dean Kimball's committee will recommend all priorities in tools and equipment in order to regulate sequence of deliveries that will best facilitate the national defense program and at the same time least disrupt private production. Previously, Edward Stettinius, Jr., director of the Division, had designated boards to deal with priorities in minerals and metals, commercial aircraft, chemicals and general products.

Acting on the tool priorities section with Dean Kimball, who takes up his duties in Washington immediately, will be Dr. W. S. A. Pott, president of Elmira College and newly appointed secretary of the Priorities Division, as well as representatives of the Army, the Navy, and the producers of machine tool equipment.

Plane Display

An exhibit showing methods used in constructing military airplanes was placed on display in Lincoln Hall. Actual parts of a complete tail assembly, including horizontal and vertical stabilizers and the dozens of specially-designed small castings and formed parts that go with them, can be seen in the main hallway on the first floor.

In the exhibit, prepared especially for the College of Engineering by the Bell Aircraft Corporation, and entitled, "Structural Detail in Modern Aircraft," are numerous photographs of Aircobra single-seater fighters and Airacuda multi-seated long-range fighters. There are also pictures, taken in the shops, showing presses, drop hammers, and milling machines turning out special parts. Methods of testing the wings, stabilizers, and fuselage are also depicted. One photograph shows a wing on which quantities of lead weights have been piled, distributed to conform to the load expected in actual flight on the basis of wind-tunnel tests.

Members of the Cornell engineering faculty are giving courses under the National Engineering Defense Training Program to employees of the Bell Aircraft Corporation in Buffalo. In the previous issue of THE CORNELL ENGINEER an article was published concerning this training course.

C.E.M. Into Triangle

Due to its continued expansion since formation late in 1939, C.E.M., the semi-honorary, all engineering fraternity, is now making plans for joining Triangle, a national engineering fraternity.

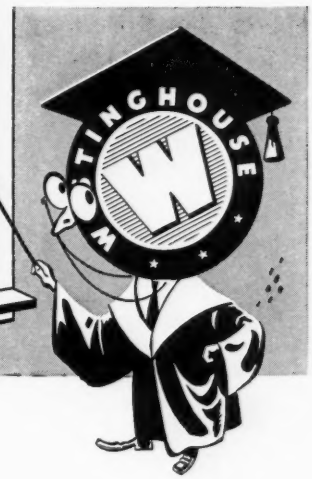
Under the guidance of Charles D. T. Raudenbush, a graduate student in Electrical Engineering and a member of Triangle at Penn State University, C.E.M. Club was formed in 1939. This club, designed to be a forerunner of a Cornell chapter of Triangle, became soon after formation a fraternity with the ideal of high scholarship as the first criterion for judgment of prospective members. Its all engineering feature is embodied in its name—"C", for Civil and Chemical; "E", for Electrical; and "M", for Mechanical; the various schools of the College.

Starting with thirteen members, it has continually expanded, demonstrating its social function by many successful parties and by occupying

(*Continued on page* 28)

What do you know about Electricity?

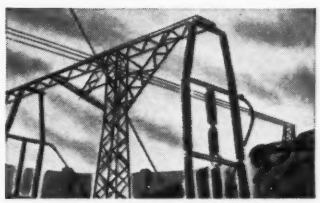
No. 2 of a Series of Modern Engineering Tests!



THE OSCILLOGRAPH

The Westinghouse cathode-ray oscillograph makes written records of electrical events occurring in as short a time as:

1. One second
2. One cycle of a 60 cycle per second wave
3. One-thousandth of a second
4. One-millionth of a second.



LIGHTNING ARRESTERS

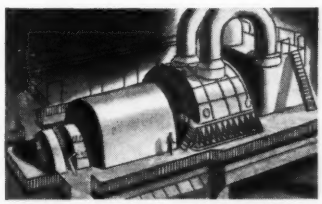
Lightning is a constant threat to transmission lines. Westinghouse has constructed lightning arresters that protect the highest voltage carried, which is:

1. 33,000 volts
2. 66,000 volts
3. 220,000 volts
4. 287,000 volts

DEEP OIL WELL DRILLING

Great depth is being attained with electric rigs using Westinghouse equipment. To date, holes have been drilled as deep as:

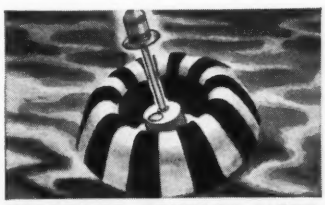
1. 1200 feet
2. 4800 feet
3. Two and one-half miles
4. Six and one-third miles.



STEAM-TURBINE GENERATOR

Installed in Philadelphia is the largest single-shaft steam-turbine generator ever constructed. It was built by Westinghouse and can develop:

1. 17,500 kw
2. 72,500 kw
3. 165,000 kw
4. 850,000 kw



SEADROME CONTACT LIGHT

The Seadrome Contact Light, developed by Westinghouse to facilitate night landing of seaplanes, is turned on and off by:

1. A man in a launch
2. An electric eye
3. Radio signals from shore
4. A submerged cable.

DE-ION PRINCIPLE

As pioneered in 1928 by Dr. Joseph Slepian, Westinghouse Research Engineer, the De-ion principle is concerned with:

1. Faster, more efficient extinction of electric arcs
2. A new method of charging for electric power
3. The theory of magnetism
4. Harnessing the power of the atom.

Let's Try It Again!

Regardless of how you came out on the last series of questions, here's another chance for you to see how familiar you are with important developments in the field of electrical engineering.

Optional answers are provided for each of the six questions listed at the left. Your task is to check the correct answer in each instance. To eliminate any peeking, the answers are printed below, upside down.

If you get four out of six correct you'll be doing all right. Five out of six passes you with honors. If you should know all the answers you can give yourself a good pat on the back.

★ ANSWERS ★

1. Ans. ..... De-ion Principle
3. Ans. ..... Seadrome Contact Light
3. Ans. ..... Steam-Turbine Generator
3. Ans. ..... Deep Oil Well Drilling
4. Ans. ..... Lightning Arresters
4. Ans. ..... The Oscillograph

WESTINGHOUSE **Westinghouse** *"The name that means everything in electricity"*

Concerning the Alumni

News from Armstrong

One of our M.E. seniors recently received word from Cecil W. Armstrong, '33, formerly a professor of mechanics and hydraulics here at Cornell. Armstrong left early this fall to take a position on the University of California's faculty as professor of aerodynamics and airplane structures. Part of his letter follows:

"Perhaps you will be interested to learn of my work here. I'm teaching all of the work offered under the heading of aerodynamics and airplane structures. Last semester I had a class of 75 and of course that meant that all of my material had to be prepared as formal lectures. The school paid all of my expenses to visit aircraft companies—and so by calling on the chief engineers of some seven aircraft companies on two different occasions—I now have a complete 4 drawer file cabinet full of wind tunnel test reports, flight test data, aerodynamic load calculations, stress and design data on several airplanes—even one U. S. military combat plane—designed, built, and in use since June, 1939 . . . So with all this material and by midnight study night after night I'm able to present up-to-the-minute material in my courses. This term I have one MWF lecture class of 60 students in airplane structures and some afternoon laboratory sections in which we run wind tunnel tests of a model airplane.

"My visits with the airplane companies afforded me a grand opportunity to get well acquainted with a number of engineers and executives—for I was treated royally. All of our graduates and then some are spoken for by the G. E., Standard Oil, aviation companies and various other companies. You may know that school here begins the last week of August and that the 1st term finishes before December 15th. Students therefore have a full month vacation for the holiday season and without worry of finals. The second semester began Jan. 20th and ends about May 18th . . . so most of them will have been on jobs a month or so before Cornell gets out."

The demand for graduate engineers, as judged by the number of jobs listed with the University Placement Bureau during the past three months, is between two and three times that of a year ago. While a good portion of this increase is caused directly or indirectly by the defense program, there are many jobs which seem to have no particular connection with defense work. The latter type of job is described usually by employers as a "normal requirement".

As might be expected, chemical, electrical, and mechanical engineers are required in larger numbers than are civil engineers. However, construction programs of the Government and of defense industries are providing jobs of from six months to several years duration for structural design and construction men.

On the page opposite this one are listed many positions currently available through the University Placement Bureau. They are published here to suggest the type of opening which is coming to the Bureau, and to the Cornell Club Employment Service in New York City. Many of these jobs have already appeared on the Job Bulletins which the Bureau sends out to its active registrants. Applications for any of the positions listed will be received by the University Placement Bureau and, if in order, will be forwarded immediately to the employer.

The University Placement Bureau offers employment service to all Cornellians without charge. Registration forms are sent upon request, and upon their return the candidate is placed on the Job Bulletin mailing list.

Chinese Alumni

For many years Chinese students have been coming to Cornell University, a large proportion of them for work in engineering. That a number have made important contributions to the welfare of their country after returning from Ithaca is demonstrated in a privately printed book that has recently been added to the Wason Chinese Collection in the University Library.

"American University Men in China," published in a limited edition by the American University Club of Shanghai in 1936, lists 28 Chinese Cornell engineers who had at that time become leaders of their profession in China. This is approximately one third of all the names listed in the chapters on this field of work.

Four held important positions with Chinese railroads. Chia-Tsun Yeh, M.C.E. '20, had been engineer of the Ping-Han Railway, managing director of the Canton-Kowlung Railway, and was secretary of the New Railway Construction Commission. Tsu Yi Chan, M.C.E. '22, was chief engineer of the Han-Pu section of the Tientsin-Pukow Railway and engineer of the Chengtu-Chungking Railway. At one time assistant director and assistant chief engineer of the last-named road, Chia Yuen Hou, M.C.E. '19, had been made director and chief engineer of the Hunan-Kweichow Railway. Ying Lo, C.E. '16, M.C.E. '17, was one of the two engineers in charge of the important Chien-Tang Bridge, and several other Cornellians held major positions on commissions regulating Chinese rivers. H. Y. Chang, M.C.E. '25, was chief engineer of the Yellow River Commission, Woodson Wang, M.C.E. '23, chief engineer of the Huai

(*Continued on page* 26)

The Cornell University Placement Bureau

WILLARD STRAIGHT HALL — H. H. WILLIAMS, '25, Director

2133. *Chief engineer* to have charge of all engineering, design, construction, and maintenance work with a large manufacturer of soap and allied products. Location: New Jersey. Age: 37-45. Salary $6500 to $7500. Must have demonstrated executive ability.

2206. *Engineer* with technical writing experience for position with producer of industrial films. Several years practical experience, including some writing required; must have record of good English grades in college and be able to explain complicated engineering facts in simple statements by means of words, diagrams and drawings. Location: Detroit, Michigan.

2203. *E.E.*, for maintenance of AC & DC motors, BC generators and installation work on outside power lines and portable cables. This work is with a company conducting open-pit mining of coal. Location: Illinois.

2193. The Panama Canal is interested in receiving applications from young graduate engineers for employment as student engineers in the Special Engineering Division located in the Canal Zone. Civil engineers are required for general civil engineering and masonry design. Mechanical engineers are required for general mechanical and machinery design. Work will be on design for the new third flight of locks and men will be transferred to field inspection thereafter. Starting salary: $150.

2201. *Engineer,* with a few years industrial experience; not over 38, to serve as assistant to the factory superintendent of a manufacturer of hard rubber specialties, primarily for the chemical, electrical and hydraulic trades. Company is small, well established and successful, and is trying to select someone willing to spend his life in the factory end of the business. Location: Trenton, N. J.

2195. *Engineer,* preferably with textile experience, with talent for research and investigation, to analyze production problems and make suggestions. Job requires considerable general experience, good personality and judgment. Pay depending on man.

2192. *Recently graduated engineer* for development department of a company manufacturing wood and steel furniture. Position leads into any branch of manufacturing and furnishes a good opportunity to get started with an established organization.

2190. *Engineering graduate* with five to fifteen years experience since graduation, for work in the Inspection Department of a fire insurance company. Work involves research, plant engineering and consulting with clients. Starting salary dependent upon ability and experience.

2189. *Executive engineer* for manufacturer of precision metal products employing 2500. Must be equipped by training, experience and temperament to take full responsibility for establishing and maintaining quality standards in production. Products are of the high volume repetitive type of manufacture. Salary commensurate with ability. Location: up-state New York.

2185. *Electrical engineer,* drafting, line layout, surveys, substation work with a utility located in Northern Pennsylvania. Some line experience desirable, but not essential.

2183. *Experienced safety engineers* (building construction); pay depends on experience. Location: New York City.

2181. *Recently graduated physicists* for instrumental inspecion on army orders; positions range from $1600-$2400, A.B. with physics major acceptable. Location: Rochester, New York.

2178. *Industrial engineer,* recent graduate, with 1-2 years practical experience in time and motion study work. Position is with a large manufacturer of photographic materials. Location: central New York State.

2177. *Graduate M.E.,* no experience necessary, starting salary $150.00 a month. The employer is a manufacturer of explosives. Location: Virginia.

2176. *M.E. or Chemical Engineer* graduated within the past few years for position with a division of United States Rubber Company in production work.

2173. *M.E.* graduates for a recently created department with an arms manufacturer. Young men recently graduated, or with at least two years of engineering required. Location: central New York State.

2169. *Engineer,* 35-40, with some engineering production and field experience for position with the aviation division of a large automobile manufacturer. Man may be one who has had some difficulty in getting started in the right type of work. Starting salary $250-$300. Many opportunities for advancement. Location: Indiana.

2168. *M.E.,* with some power plant experience since graduation, preferably a resident of northern New Jersey. Position is with a large metal working company.

2167. *Design and development engineer* with highly developed inventive qualifications. Must be an excepitonal man. Position is with a manufacturer of power transmission appliances, variable speed control units. Location: Indiana.

2166. *C.E.* for structural design, steel and concrete. Qualified architect acceptable. Position is with a consultant in New York City.

2161. *Sales engineer* for middle west, lubrication experience. Job is 80% engineering. Pay opening.

2159. *Junior thermal engineer* for the engineering staff of a manufacturer of air conditioning equipment. Should be a good mathematician, with experience of a year or more of heat transfer. Location: Buffalo, N. Y.

2158. *Engineers* experienced in steel plant operation and design, to serve as squad leaders, checkers, designers, and computers, with a firm of engineers and contractors, located in Cleveland. Design positions available in following divisions:—Coke oven, power, rolling mills, shops, general plant, structural, electrical and technical.

2157. *Engineer,* with industrial experience and labor management experience of about 5-10 years, for position with a furniture manufacturer in Georgia.

2156. *Rodman* and an instrument man for work on a grade-crossing elimination project in New York State. Job to begin about the middle of February and to last until late next fall.

2155. *M.E.,* not over 30, with at least two years experience in a laboratory working on lubrication problems either with an oil company, automobile manufacturer, or a university. Job consists of supervision of operation of engines employed in lubrication research. Location: Delaware.

2154. *Draftsman and designer* for company manufacturing fuel burning and steam generating equipment. Work consists of layout on detailed drawings of boilers and boiler layout. Location: Massachusetts.

2151. *Young engineer,* good draftsman, with some knowledge of structural steel design and mechanical engineering for small company making sliding doors; salary $40.00 per week.

2147. *Plant engineer* with textile experience to be responsible for the operation of the power plant of a textile manufacturer. Plant includes two boilers, a steam engine and two Diesels. Work also includes direction of maintenance crew on installation and repair of plant and equipment. Salary: $240 per month. Location: Mass.

2145. *M.E.* out one to four years for either sales or operating department of a company manufacturing welding equipment. Metallurgical experience helpful. Location: New York.

2144. *C.E.* with training and experience in general construction and plant layout. Location: Ohio.

2143. *Young mechanical or electrical engineer* to serve as assistant to the plant engineer of a company manufacturing glass products. Work to consist primarily of planning and layout of plant power lines, steam lines, water lines and other services. Man out three or four years. Experience in this line preferred. Salary: about $175 a month. Location: Ohio.

2142. *Mechanical or Chemical Engineer* with at least 2 years practical experience for plant improvement and operation work with a large manufacturer of photographic equipment. Location: central New York.

2141. *E.E.,* young, preferably single, for work on communications system of a railroad. Location: eastern Pennsylvania.

CORNELL SOCIETY of ENGINEERS

JOHN P. SYME '26, President
22 East 40th St., New York, N. Y.

C. REEVE VANNEMAN '03, Executive Vice President
555 Providence St., Albany, N. Y.

EZRA H. DAY '18, Vice-President
1081 Broad Street Station Building, Philadelphia, Pa.

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HENRY B. BREWSTER '98, Vice President
615 James St., Syracuse, N. Y.

GEORGE N. BROWN '08, Vice President
8 Tower Drive, Maplewood, N. J.

HERBERT B. REYNOLDS '11, Recording Secretary
600 W. 59th St., New York, N. Y.

PAUL O. REYNEAU '13, Secretary-Treasurer and Placement Director
Cornell Club, 107 E. 48th St., New York, N. Y.

"The objects of this Society are to promote the welfare of the College of Engineering at Cornell University, its graduates and former students and to establish a closer relationship between the college and the alumni."

President's Message

Fellow Engineers:

The Regional Sections report many activities during the past several months, as well as plans for the future.

The Syracuse Section held a Smoker at the University Club on Wednesday evening, January 15th, with Dean Emeritus Dexter S. Kimball as the guest speaker. Dean Kimball reviewed the early history of Cornell and, more particularly, the Engineering College.

H. B. Brewster '98, the very active Chairman and Vice President of the Society, reports that they are planning a forum, primarily touching on defense, including representatives from the larger local plants, for their annual meeting early in April.

As an example of the spirit of cooperation and self-sacrifice with which engineers and industrialists all over the country are entering into defense activities, we give you H. B. Brewster. He is one of the five local members of the American Society of Civil Engineers working with the national body, one of seven members of a defense council of the Technology Club of Syracuse, a member of the Mayor's Defense Council of Syracuse, the Defense Council of the American Legion, *and* a member of the Selective Service Board No. 463.

The Philadelphia Region has been ably chairmaned this winter by Ezra H. Day '18.

Edwin H. Brown, Secretary-Treasurer of the Section, reports a well attended luncheon meeting on January 29th at the Engineers Club of Philadelphia.

Mr. William ("Bill") Littlewood '20, Vice-President in Charge of Engineering, American Airlines, gave a short talk outlining the programs of airplane design over the past years, high-lighting the development of the variable pitch constant-speed propeller, the increased horsepower-weight ratio of the radial aviation engine, the methods of overcoming ice-formation, the problems of heating and ventilating for passenger and crew comfort, the question of weight distribution, and touching to a lesser degree on the control features as they apply to safety and ease and reliability of engine performance and airplane operation.

A sound film was also shown, entitled "Flagships on Parade". This film has just been released to the public and depicts the extent of the operations of the American Airlines, but dwells particularly on the facilities of that Company for personnel training and airplane maintenance and operation at La Guardia Field, New York.

The meeting was held at the time of the national A.I.E.E. Convention, and a number of out-of-town Cornell engineers were present, including Director W. A. Lewis and Professors Chamberlain, Strong and Burckmeyer, of the School of Electrical Engineering.

On the evening of Friday, January 17th, at the time of the national A.S.C.E. Convention, the New York Section held a dinner meeting. Speakers were John ("Terry") McGovern '00 and the Honorable Godfrey Haggard, British Consul General of New York. Mr. McGovern, as well known to Englishmen as to Cornellians, introduced the Consul General, who gave a realistic picture of conditions in England and on the various battle fronts, from an official British point of view. Guests of honor included Director Malcolm and Professor Underwood of the School of Civil Engineering.

The Executive Committee of your Society voted at a meeting held on December 19th, 1940, to donate from its general treasury a sum of $250.00 to the Alumni Fund, to be ear-marked for the benefit of the College of Engineering. It was hoped by this action not only to provide some tangible assistance, but more importantly to point out a manner in which all Cornell Engineers who are able to do so may help to further the progress of engineering at Cornell.

Sincerely yours,

John P. Syme,

President.

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Twin Falls

(*Continued from page* 9)

ment, let alone any of the farms.

Today, if you were to go along the edge of Rock Creek, you would see only a few old shacks down in the canyon. Faster than most people believed possible, the immigrants were assimilated. Some of them found jobs in the stores in town. Others went to work as farm hands, and are now renting farms. Many of the farms on the edge of town were cut into acre plots and sold reasonably cheap. The city limits were extended twice between 1932 and 1938, and the population increased fifty percent in the six years. The growth has not stopped yet, as every day during the summer cars loaded with belongings and children arrive from some part of the Midwest.

Twin now has a population of 12,000. We people in town have great faith in our city and feel that there is not a better place anywhere. On week days we think there is not much happening, but on Saturdays, when all the farmers from Buhl to Burley come to town, we realize that Twin is a metropolis, a city developed by reclamation in the heart of what is now one of the most fertile and productive regions in the United States.

Chinese Alumni

(*Continued from page* 22)

River Commission, and Shih-ta Hsu, M.C.E. '20, chief engineer of the North River Commission; and Shu-t'ien Li, Ph.D. '26, a former member of the last-named body, had become dean of the National Pieyang Engineering College.

Yu-Tsuan Ku, M.M.E. '29, Ph.D. '31, was a professor at the National Central University and director of the National Bureau of Industrial Research. Hsieh Chun Chiu, M.C.E. '18, was engineer of the Bureau of Public Works at Shanghai. Jen Chow, M.E. '14, M.M.E. '15, was director of the Institute of Engineering, Mao Kie Chen, C.E. '12, research fellow in the Institute of Physics, and Tsu Kong Chao, Grad. '30, a professor at Nanyang University in Shanghai, engineer-in-chief and director of bureaus of public works and highways in several cities, and vice director of the Bureau of Roads. Tsi Hwei Shen, B.S. '21, M.S. '23, was doing distinguished work in chemical research at Chiao-Tung University.

In the field of electricity Cornellians were also active. S. Y. Lung, M.E.E. '23, was director of the electrical works at Wuchow, Kuo Pao Pao, M.E. '22, chief engineer of the Foochow Electric Company, Kwung Hsu, M.S. '18, engineer of the Peiping Tramway Company, E. Fah Wei, M.E. '12, chief technical expert and vice minister of the Ministry of Communications, and Waken Chang, M.E.E. '25, manager of the Asiatic Manufacturing Company and the Eastern Neon Light Company.

In addition to these, eight others, who cannot be positively identified through the Cornell Alumni Directory, possibly because of changes in name, are listed as Cornellians who achieved leadership in engineering. Among them are F. S. Shen, chief engineer of the Yangtze River Commission, C. L. Chow, chief engineer of the Chekiang Conservancy Bureau, C. C. Chang, chief of the electrical department of the National Construction Commission, and Hsu Kuen Sun, principal engineer of the Bureau of Public Works and chief of the division of bridges, structures, conservancy, and parks for the city of Shanghai. The late C. Yong is given credit for the first attempt to organize engineering research in China, resulting in the foundation of the National Central Research Institute. All are listed as holding advanced degrees in engineering from Cornell.

Prof. Jeffrey

(*Continued from page* 10)

not satisfied until he can make his experiment prove the theoretical laws it is meant to support.

There is still another side to Professor Jeffrey. The physical evidence may be seen out on the Trumansburg road, where a neat, homemade picket fence surrounds a large lawn planted with pine trees and flower gardens. There is a house with an outdoor fireplace behind it. This is the base from which Professor and Mrs. Jeffrey start out on picnic outings to Watkins Glen or Taughannock in the summer time, or proms and basketball games in the winter. This year the Saturday defense course, at which he lectures, kept the Jeffreys from the Prom and made him miss his first Penn basketball game in 20 years. Mrs. Jeffrey is a graduate of Ohio State University. Any family strife over the football games of the last two years has not leaked out as yet.

So as you look at the picture of the man sitting at his desk, you see a professor who has done and will continue to do things for Cornell.

Friedrich

(*Continued from page* 11)

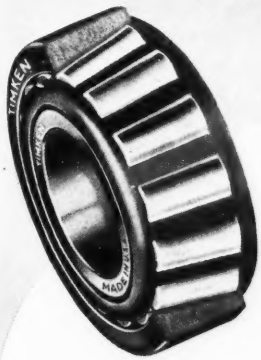
The junior year was also marked by participation in the Freshman Advisory Board and the Engineering Council. This year, in this capacity, Ed is in charge of the Cornell Day activities of the School of Electrical Engineering. In addition he is a member of the Crew Club and Phi Kappa Psi.

Although not planning to go into pure electrical engineering, Ed got a good taste of its more practical side last summer in the maintainance division of the Eastman Kodak Company. He believes his education has been invaluably enhanced by the ability to bend pipe, solder joints, and especially to make a job fit the time allotted to it. He is quite proud of his achievement of utilizing one complete afternoon for drilling two small holes in the ceiling of a dark room.

His present plans call for a year of training after graduation at the New York Trade School in preparation for service with his father's metal fabrication business, in which he has worked for several summers.

Were it not for the prosaic business of earning a living, Ed would like to spend all of his time at a piano or on skis. In lieu of this, however, he gives vent to his musical urge by singing in the Sage Choir, playing the French horn in a local quartet, and occasionally playing on the Bailey Hall organ. At other times one is very likely to find him out in the hills perfecting his ski technique. For with the draft uppermost in every young man's mind, what could be more pleasant than the prospect of a solid year with the army ski patrol?

EVERY GOOD ENGINEER MUST KNOW HIS BEARINGS



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Ohaus

(*Continued from page* 10)

Desk Book if you want to know just about everything concerning Cornell—generous sprinklings about Cornell's history, sports, societies, publications and clubs. Bob's particular job in connection with the Forum series is to get the speakers.

How, we wonder, is it possible to carry so many activities and at the same time keep a berth on the Dean's Honor List, a record he has maintained throughout his four years? Give a job to a busy man if you want it done! That must have been the sentiment of Bob's fraternity brothers when they elected him house president of Theta Xi.

We can readily understand how Bob can truthfully say that he has but little spare time; yet he frequently represents Theta Xi on its football, softball and tennis interfraternity teams. During the summer he enjoys swimming, and boating most of all.

When Bob first entered the engineering school, the future of his profession was very uncertain; after four years, the present national expansion has so changed the complexion of things that Bob is now faced with another, perhaps more serious, problem—selecting the job which offers security and stability of income, as well as the best chances of advancement, after the period of emergency passes. Being one of the outstanding men of his class, both in grades and in activities, Bob has received so many offers that he is finding it hard to make up his mind which firm to work for. Impressed by the offer of Admiral Yarnell during his recent visit, Bob may enlist in the Ordnance Department of the United States Naval Reserve as an ensign; he has not as yet, however, signed his life away on any of the numerous naval applications which were passed out so freely at that time.

College News

(*Continued from page* 20)

a complete floor in Waite Hall this year.

With a highly satisfactory record during its short history it is hoped that with its incorporation in Triangle, it will also become a service organization for the College.

Captain Robert I. Dodge, Jr., M.E. '29, U. S. Signal Corps, addressed senior Cornell engineers February 14, on "Technical and Administrative Problems of Plant Engineering." He has been an engineer with the American Telephone and Telegraph Company since his graduation in 1929. He has specialized in outside plant engineering work with various staff organizations of the Long Lines Department. He holds a Professional Engineers' License in the State of New York. In his military activity he has been an active reserve officer in the Organized Reserve Corps and is now on a year's active duty as signal officer with the R.O.T.C. here at Cornell.

Societies

A.S.M.E.

Robert A. Bridgman M.E. '41, addressed the Cornell Student Chapter of the A.S.M.E. on Tuesday evening, February 18th on "The Marine Transportation of Petroleum." He told of a recent 40,000 mile trip aboard oil tankers which took him along both coasts of the United States and across the Pacific to Russia. The tanker was originally chartered to ply between New York and San Francisco, but when it reached the west coast it was ordered to Russia. Bob did not get back to New York until December, 1940—just in time to prepare for the spring term.

Most of his talk, however, was confined to a discussion of tankers —their construction, design, relative tonnages and types.

New officers of the Student Branch, all juniors, are H. M. St. John, Jr., chairman; J. W. Hart, vice chairman; and H. E. Otto, Jr., secretary-treasurer.

A.I.E.E.

Professor W. A. Lewis, Jr., Director of the School of Electrical Engineering, Cornell University, delivered two lectures this month to sectional meetings of the American Institute of Electrical Engineers. On February 14 he addressed the Lehigh Valley Section, at Bethlehem, Pa., on "Unbalanced Loads and Short Circuits on Three-Phase Systems"; the Syracuse Section on Feb. 24 on "Symmetrical Components without Mathematics."

Stress and Strain

Some girls are like roads: dangerous curves, soft shoulders; and you can't tell where they will lead you.

* * *

Young Appealing Lass: "I'm going to call you Pilgrim from now on."

Wilson: "Why Pilgrim?"

Young Appealing Lass: "Because each time I go with you, you make more progress."

* * *

Jack and Jill went up the hill
Upon a moonlight ride;
When Jack came back,
One eye was black,
His pal, you see, had lied.

—Kansas Engineer

* * *

Mechanics Prof.: "Name a great timesaver."

Sophomore: "Love at first sight."

* * *

"Paw, what is a bicuspid?"

"A bicuspid, my boy is a double barreled spittoon."

* * *

"Why is a ship called a she?"

"Because her rigging costs more than her hull."

—Kansas Engineer

* * *

"I am sorry," said the dentist over the phone, "but you cannot have an appointment with me this afternoon. I have eighteen cavities to fill." And, picking up his golf bag, he left the office.

* * *

There was once an old colored woman who named her children "Surely," "Goodness," and "Mercy" so they would follow her all the days of her life.

* * *

"Hell," said the devil as he picked up the telephone.

* * *

He: "Do you believe kissing is unhealthful?"

She: "I couldn't say — I've never —"

He: "You've never been kissed?"

She "I've never been sick."

—Arkansas Engineer

* * *

Soph: "Why is it that gentlemen prefer blondes?"

Frosh: "I'll bite; why is it?"

Soph. "Where's there's light there's heat."

—Arkansas Engineer

Engineers - -

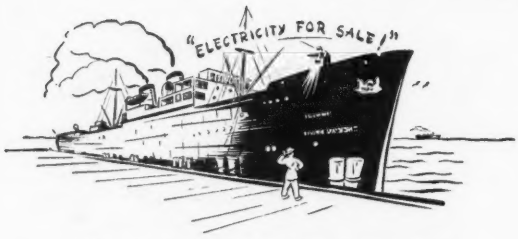
You don't need a slide rule
to prove you can save $2.
by purchasing your - -

1941 Cornellian

before March 15

Now $7 - After March 15, - $9

G-E Campus News



FLOATING POWER

BACK in '29, when the water supply in Tacoma, Washington, was so low that the hydro-electric stations could not generate enough electricity for the city's requirements, the U.S.S. *Lexington*—a turbine-electric drive airplane carrier—supplied the power necessary to tide the city through the emergency.

A year later on the opposite side of the country, the *Jacona*, a ship built during the last war, was made into a floating power plant by installing two 10,000-kw turbine-generators in its hull. It is at present in service on the Piscataqua River near Portsmouth, N. H.

General Electric is now studying the possibilities of a 50,000-kw floating power plant, which could be towed through America's coastal and inland waterways and hooked up to regular distribution lines to generate electricity in emergencies. Such a generating station could be housed in a hull similar to that of a lake freighter.

GIANT ATOM SMASHER

SO powerful that its atom-smashing beam of ions would melt an ordinary brick as fast as a blowtorch would melt a pound of butter will be the U. of California's new 100,000,000-volt cyclotron. The 4900-ton giant—16 times more powerful than the present outfit—will generate atomic energies greater than any now in existence except in distant stars or elsewhere in cosmic space.

Atomic particles will be fed into a circular chamber where they will receive successive "kicks," whirling them around in continually widening circles until they reach a window or port on the side of the chamber. The element to be bombarded will be placed over this window where it will receive the full force of the ion beam.

For this machine General Electric is building electric equipment, which will occupy the space of a two-story house. The chief function of this equipment will be to make ordinary electric current capable of operating the giant atom smasher.

DETECTIVE STORY

ALBANY HOSPITAL was in an uproar. The technicians in charge of the hospital's radium supply had lost a radium "needle"—only 3.3 milligrams to be sure, but enough to burn a person seriously if the needle were caught for long in his shoe or clothing.

An appeal for help was sent to the General Electric Research Laboratory in Schenectady for a "Geiger Counter"—an electric "ear" which detects and amplifies the otherwise inaudible "explosion" of the radium as it breaks down.

When Dr. C. W. Hewlett (N. C. State, '06) of the G-E Research Laboratory entered the suspected operating room, the counter immediately began to "cluck" its warning of radioactivity nearby. After a false start, the counter took to the trail like the Hawkshaw it is, and eventually, as Dr. Hewlett lowered it to the floor in front of a radiator, the clucks became barks. And there, snuggled against the wall under the radiator, was the missing radium.

GENERAL ELECTRIC